

NASA SBIR/STTR Technologies

High-Fidelity Lunar Dust Simulant

Orbital Technologies Corporation – Madison, WI

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07-2 X7.04-9706



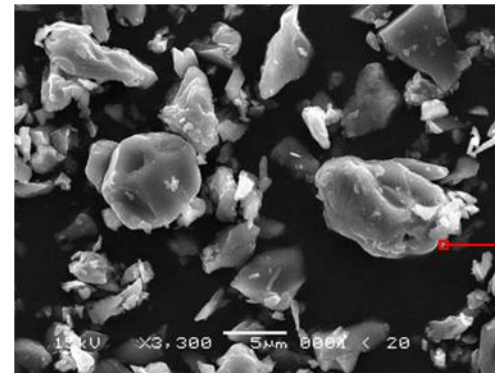
Identification and Significance of Innovation

ORBITEC is developing high-fidelity lunar dust simulants that better match the unique properties of lunar dust than existing simulants (such as JSC-1AVF). Current lunar dust simulants do not have enough of the very fine particles, lack the agglutinitic glass with nanophase iron (Fe^0), and lack the complex surface textures that dominate lunar dust. The prototype lunar dust simulants developed in Phase 1 approximate the particle sizes, morphology, and composition of lunar dust.

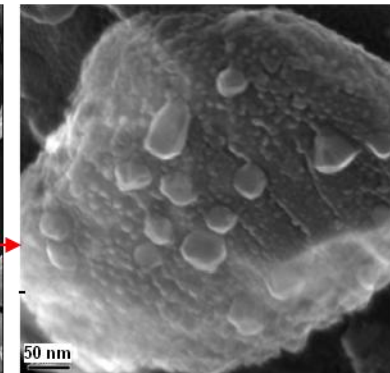
TRL Range at beginning & end of Phase 2 Contract: 4 → 5/6

Technical Objectives and Work Plan

- Task 1. Determine the Requirements for the Deliverable Lunar Dust Simulant
- Task 2. Refine the Manufacturing Process for the Lunar Dust Simulant
- Task 3. Create an Improved Prototype Lunar Dust Simulant
- Task 4. Characterize and Evaluate the Improved Prototype Lunar Dust Simulant
- Task 5. Finalize the Manufacturing Process for the Deliverable Lunar Dust Simulant
- Task 6. Produce the Deliverable Lunar Dust Simulant
- Task 7. Characterize the Deliverable Lunar Dust Simulant
- Task 8. Distribute the High-Fidelity Lunar Dust Simulant
- Task 9. Project Management and Reporting



Prototype Lunar Dust Simulant



Fe-rich Nanophase Droplets in the Prototype Dust Simulant

NASA and Non-NASA Applications

High-fidelity lunar dust simulants are required to evaluate the effects of lunar dust on the operation of all Exploration Surface Systems. Accurate lunar dust simulants are needed to verify the effectiveness of dust mitigation strategies and technologies for extravehicular mobility suit material composition and cleaning operations, lunar habitat construction design, mechanical performance (radiators, seals, valves), electrical performance (tools and equipment), landing operations (vision systems), and surface operations. Since this dust simulant contains the critical metallic iron component (including nanophase Fe^0), it may also be applicable to human health studies.

Firm Contacts

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NON-PROPRIETARY DATA